

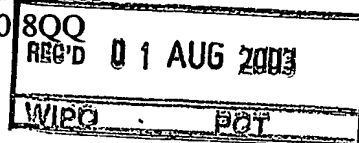


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PCT/GB 2003 / 002797

INVESTOR IN PEOPLE

17 FEB 2005

The Patent Office
Concept House
Cardiff Road
Newport
South Wales
NP10 8QQ



PRIORITY DOCUMENT

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I, the undersigned, being an officer duly authorised in accordance with Section 74(1) and (4) of the Deregulation & Contracting Out Act 1994, to sign and issue certificates on behalf of the Comptroller-General, hereby certify that annexed hereto is a true copy of the documents as originally filed in connection with the patent application identified therein.

In accordance with the Patents (Companies Re-registration) Rules 1982, if a company named in this certificate and any accompanying documents has re-registered under the Companies Act 1980 with the same name as that with which it was registered immediately before re-registration save for the substitution as, or inclusion as, the last part of the name of the words "public limited company" or their equivalents in Welsh, references to the name of the company in this certificate and any accompanying documents shall be treated as references to the name with which it is so re-registered.

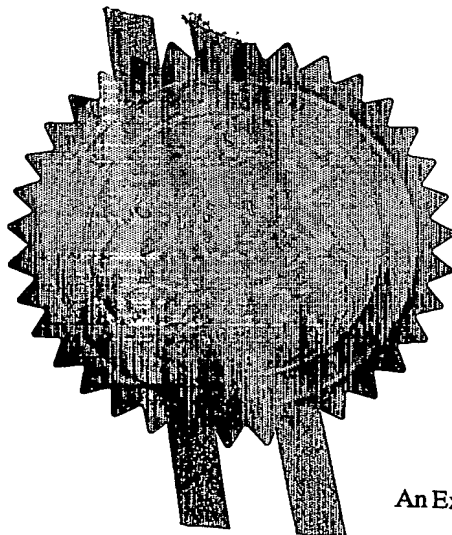
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Re-registration under the Companies Act does not constitute a new legal entity but merely subjects the company to certain additional company law rules.

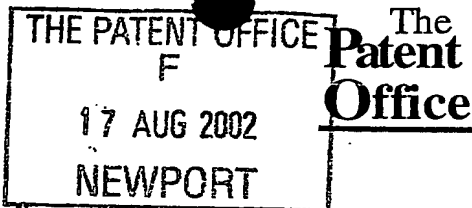
Signed

H. Behan

Dated 23 July 2003



An Executive Agency of the Department of Trade and Industry



19AUG02 1741872-1 000393
P01/7700 0.00-0219209.4

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Request for grant of a patent

(See the notes on the back of this form. You can also get an explanatory leaflet from the Patent Office to help you fill in this form)

The Patent Office

Cardiff Road
Newport
Gwent NP10 8QQ

1. Your reference

2002P12987 GB / P72 / CF / GD

2. Patent application number
(The Patent Office will fill in this part)

0219209.4

17 AUG 2002

3. Full name, address and postcode of the or of each applicant (underline all surnames)

OXFORD MAGNET TECHNOLOGY LTD.
WHARF ROAD, EYNHAM
OXFORD OX8 1BP

Patents ADP number (if you know it)

64776002

If the applicant is a corporate body, give the country/state of its incorporation

UNITED KINGDOM

4. Title of the invention

MANAGEMENT OF COMPRESSOR OIL CARY
OVER TO THE PTR COLD HEAD

5. Name of your agent (if you have one)

"Address for service" in the United Kingdom to which all correspondence should be sent (including the postcode)

Siemens Shared Services Limited
Intellectual Property Department
The Lodge, Roke Manor
Romsey
Hampshire SO51 0ZN

Patents ADP number (if you know it)

08439358001

If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each these earlier applications and (if you know it) the or each application number

Country Priority application number
(if you know it)

Date of filing
(day / month / year)

If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application

Is a statement of inventorship and of right to grant of a patent required in support of

Yes

this request? (Answer 'Yes' if:

- a) any application named in part 3 is not an inventor, or
 - b) there is an inventor who is not named as an applicant, or
 - c) any named applicant is a corporate body.
- See note (d))

9. Enter the number of sheets for any of the following items you are filling with this form.
Do not count copies of the same document

Continuation sheets of this form

Description	1
Claim(s)	0
Abstract	0
Drawing(s)	1+1

10. If you are also filing any of the following, state how many against each item.

Priority documents

Translation of priority documents

Statement of inventorship and right to grant a patent (*Patents Form 7/77*)

1

Request for preliminary examination and search (*Patents Form 9/77*)

Request for substantive examination (*Patents Form 10/77*)

Any other documents
(please specify)

11.

I/We request the grant of a patent on the basis of this application

Signature

Date

C French

Clive French
Intellectual Property Department

16.08.2002

12. Name and daytime telephone number of Person to contact in the United Kingdom

Clive French

01794 833573

Warning

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United Kingdom for a patent for the same invention and either no direction prohibiting publication or Communication has been given, or any such direction has been revoked.

Notes

- a) If you need help to fill in this form or you have any questions, please contact the Patent Office on 0645 500505
- b) Write your answers in capital letters using black ink or you may type them
- c) If there is not enough space for all the relevant details on any part of this form, please continue on a separate sheet of paper and write "see continuation sheet" in the relevant part(s). any continuation sheet should be attached on this form.
- d) If you have answered 'Yes' Patents Form 7/77 will need to be filed.
- e) Once you have filled in the form you must remember to sign and date it.
- f) For details of the fee and ways to pay please contact the Patent Office.

Management of Compressor oil carry over to the Pulse Tube refrigerator (PTR) Cold head

Authors : Milind Atrey, D. Crowley, P. Daniels

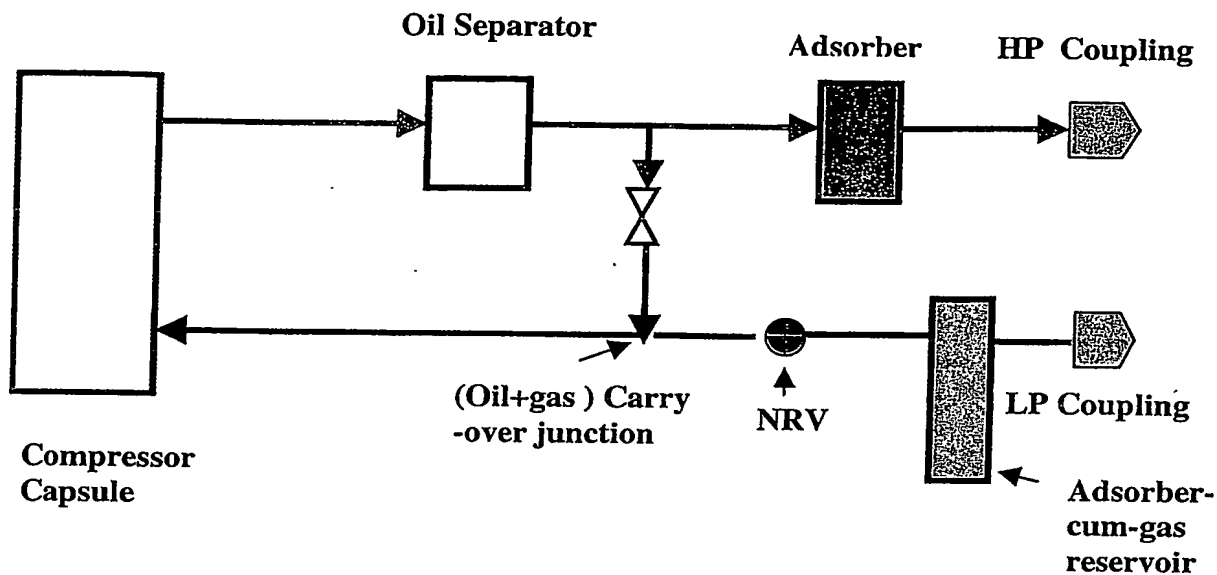
Oil Carry over in the PTR

It is observed that oil migrates from the compressor to the PTR cold head through the Low pressure (LP) flex line. The reason for this is a high pressure difference developed due to stoppage of the PTR's rotary valve when the compressor is dynamic. When the rotary valve stops, the compressor pressure increases to a very high value, 28-29 bar approximately, and the low pressure flex line experiences a sudden fall in the pressure down to 1.5- 2 bar approximately. As a result, a part of the (oil+ gas) mixture is bypassed internally without going to the adsorber and also travels across the non return valve (NRV) due to high pressure difference. If this action continues over a period of time, the LP flex line becomes flooded with oil and then the PTR cold head and the high pressure flex line also. The PTR in this condition can not function satisfactorily and one may have to discard the whole system due to severe contamination.

Modification in compressor circuit to overcome Oil-migration

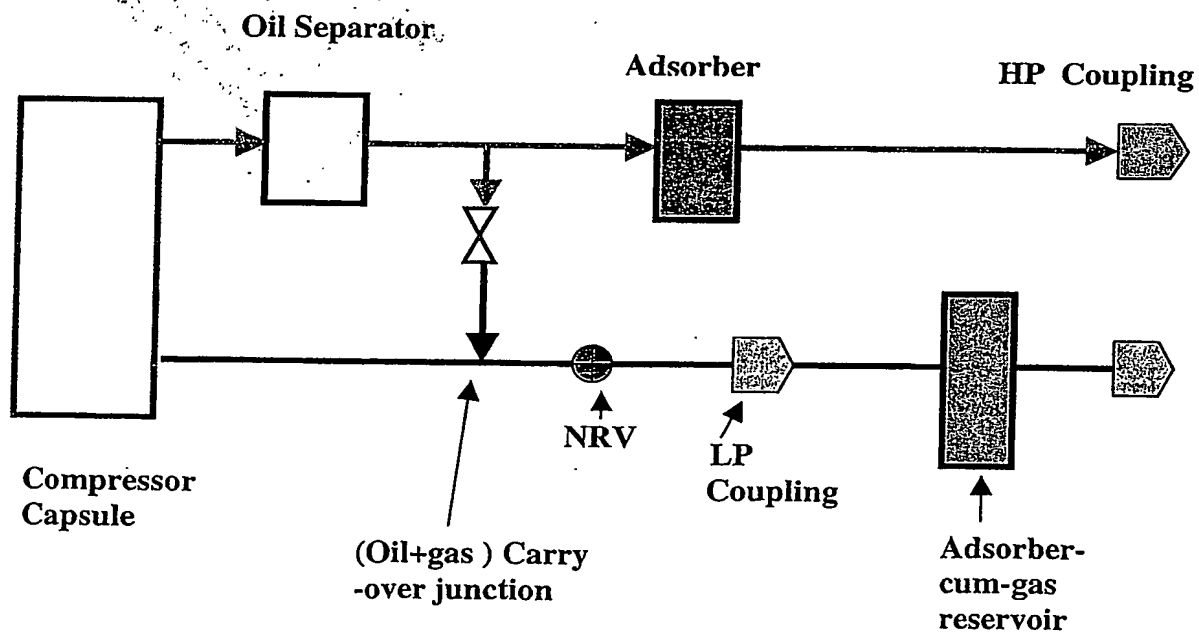
It is proposed to have an adsorber in the LP line after the NRV as shown in the schematic -1. This serves two purposes, both prevention and cure of oil carry over. Having a gas reservoir in the LP helps to reduce the pressure differential across the NRV when the Rotary valves stops suddenly. This prevents or decreases the risk of oil migration depending on the volume of the gas reservoir. On the other hand, if the oil migrates, the adsorber would strip the gas of the oil and only gas would travel to the PTR cold head.

The same purpose could be served if the adsorber is kept after the LP self sealing coupling by employing a length of flex line outside the compressor unit. It can then be connected to the PTR cold head using one more self sealing couplings.



Schematic - 1

Adsorber between NRV and LP connector



Schematic - 2

Adsorber after LP connector